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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Roquemore
For	:	Dual-Communication Electronic Shelf Label System and Method
Serial No.	:	10/659,661
Filed	:	09/10/2003
Group	:	2635
Examiner	:	Au, Scott D.

Durham, North Carolina
April 23, 2008

MAIL STOP APPEAL BRIEF – PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF

Sir:

1. The Real Party In Interest

The real party in interest is the assignee, NCR Corporation.

2. Related Appeals and Interferences

None.

3. Status of the Claims

This is an appeal from the November 26, 2007 final rejection of claims 1-16, all of the pending claims. Claims 1-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over Dalton

U.S. Patent No. 6,419,154 ("Dalton") in view of Matsushita U.S. Patent No. 6,762,674 ("Matsushita") and further in view of Ramamurthy U.S. Patent No. 6,853,294 ("Ramamurthy"). Claims 10-11 and 13-16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Dalton in view of Matsushita and further in view of Neumark U.S. Patent No. 6,736,316 ("Neumark"). Claims 9 and 12 were rejected under § 103(a) as unpatentable over Dalton in view of Matsushita and further in view of Neumark and Ramamurthy. Pending claims 1-16 are the subject of this appeal.

4. Status of Amendments

The last amendment entered was filed on January 16, 2007. An Amendment After Final is being filed herewith to correct an informality in claim 10 noted during the preparation of this Appeal Brief.

5. Summary of Claimed Subject Matter

The present invention advantageously provides methods and apparatus for dual communication between a base station and an electronic shelf label, using wireless uplink and downlink communication operating in different modes.

Claim 1

In one aspect, the invention of claim 1 comprises a base station including first wireless downlink communication circuitry and first wireless uplink communication circuitry operating in a different mode than the first wireless downlink communication circuitry, as shown at (14), (26), and (24), and discussed at p. 3, lines 9-24, for example. The invention of claim 1 further comprises a plurality of electronic shelf labels, each electronic shelf label including second wireless downlink communication circuitry for receiving messages from the first wireless downlink communication circuitry of the base station, and second wireless uplink

communication circuitry for sending messages directly to the first wireless uplink communication circuitry of the base station, as shown at (16), (34), and (36), and discussed at p. 4, lines 15-17, for example, wherein the base station operates to concurrently transmit a first message to a first electronic shelf label and receive an overlapping second message from a second electronic shelf label over separate communication channels, as discussed at p. 4, lines 7-14, for example.

Claim 9

In another aspect, the invention of claim 9 comprises an electronic shelf label system employing duplex data communication between a base station and a plurality of electronic shelf labels. The system comprises a base station including first wireless downlink communication circuitry and first wireless uplink communication circuitry operating at a substantially lower frequency than the first wireless downlink communication circuitry, as shown at (16), (24), and (26), and discussed at p. 3, lines 14-16 and lines 29-31, for example. The invention of claim 9 further comprises a plurality of electronic shelf labels, each electronic shelf label including second wireless downlink communication circuitry for receiving messages from the first wireless downlink communication circuitry of the base station, and second wireless uplink communication circuitry for directly sending messages to the first wireless uplink communication circuitry of the base station, as shown at (16), (34) and (36), and discussed at p. 4, lines 15-17, for example. The invention of claim 9 further comprises a computer coupled to the base station via a cable for sending messages to the electronic shelf label via the first and second wireless downlink communication circuitries, as shown at (12), (50), (24), (52), and (34), and discussed at p. 2, line 30-p. 3, line 16, for example, and for receiving messages from the electronic shelf label via the first and second wireless uplink communication circuitries, as

shown at (12), (50), (26), (54), and (36), and discussed at p. 2, line 30-p. 3, line 16, for example, wherein the base station operates to concurrently transmit a first message to a first electronic shelf label and receive an overlapping second message from a second electronic shelf label over separate communication channels, as discussed at p. 4, lines 7-14, for example.

Claim 10

In another aspect, the invention of claim 10 comprises a method of duplex data communication between a base station and a plurality of electronic shelf labels comprising the steps of wirelessly sending a first message in a first time period to a first electronic shelf label by utilizing first downlink communication circuitry in the base station, as shown at (54) and (56) and discussed at p. 5, lines 6-9, for example. The invention of claim 10 further comprises receiving the message utilizing second downlink communication circuitry in the first electronic shelf label, as shown at (58) and discussed at p. 5, lines 10-11, for example, wirelessly sending a response to the base station in a second time period using a different mode of communication utilizing first uplink communication circuitry in the electronic shelf label, as shown at (62) and discussed at p. 5, lines 17-24, for example, receiving the response in a second time period from the first electronic shelf label by utilizing second uplink communication circuitry in the base station, as shown at (64) and discussed at p. 5, lines 28-29, for example, and wirelessly sending a second message during the second time period to a second electronic shelf label utilizing the first downlink communication circuitry in the base station, sending of the second message to the second electronic shelf label being performed over a different communication channel than receiving of the response from the first electronic shelf label, as discussed at p. 4, lines 7-14, for example.

Claim 12

In another aspect, the invention of claim 12 comprises a method of concurrently communicating with a plurality of electronic shelf labels comprising the steps of sending first and second messages to a base station through a cable by a computer, as shown at (12), (50), and (14), and discussed at p. 3, lines 9-12, for example, wirelessly sending the first message to a first electronic shelf label using a first frequency and first downlink communication circuitry in the base station, as shown at (14), (24), and (52), and discussed at p. 3, lines 9-31, for example, receiving the first message by second downlink communication circuitry in the first electronic shelf label, as shown at (16) and (34) and discussed at p. 4, lines 24-25, for example, wirelessly sending a response to the base station at a second frequency different than the first frequency by utilizing first uplink communication circuitry in the first electronic shelf label, as shown at (16), (36), and (54), and (62), and discussed at p. 5, lines 17-24, receiving the response by second uplink communication circuitry in the base station, as shown at (14), (26), and (64), and discussed at p. 5, lines 28-29 and p. 3, lines 23-24, for example, transmitting the second message to a second electronic shelf label using the first frequency and first down link communication circuitry in the base station concurrently with said step of receiving the response receiving of the first message from the first electronic shelf label and transmitting of the second message to the second electronic shelf label occurring simultaneously over separate communication channels, as shown at (14), (24), and (52), and discussed at p. 4, lines 7-14, for example, and receiving the response through the cable by the computer, as shown at (66) and discussed at p. 5, lines 30-31.

6. Grounds of Rejection to be Reviewed on Appeal

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dalton in view of Matsushita and further in view of Ramamurthy. Claims 10, 11, and 13-16 stand rejected

under 35 U.S.C. § 103(a) as being unpatentable over Dalton in view of Matsushita and further in view of Neumark. Claims 9 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dalton in view of Matsushita and further in view of Neumark and Ramamurthy.

7. Argument

A. Rejection under 35 U.S.C. § 103(a) over Dalton, Matsushita, and Ramamurthy

The rejection based on Dalton, Matsushita, and Ramamurthy is not supported by the relied upon art. 35 U.S.C. § 103 which governs obviousness indicates that "differences between the subject matter sought to be patented and the prior art" are to be assessed based upon "the subject matter as a whole". Analyzing the entirety of each claim, the rejections under 35 U.S.C. § 103 are not supported by the relied upon art as addressed further below.

Only after an analysis of the individual references has been made can it then be considered whether it is fair to combine teachings. However, as addressed further below, fairness requires an analysis of failure of others, the lack of recognition of the problem, and must avoid the improper hindsight reconstruction of the present invention. Such an analysis should consider whether the references combine in an obvious way to achieve the subject matter encompassed by the claim, rather than assuming that a combination is obvious. The 35 U.S.C. § 103 rejections made here pick and choose elements from separate references, none of which, when combined with knowledge of the state of the art, provides any basis for concluding the subject matter as a whole would be obvious to one of ordinary skill in the art. This approach constitutes impermissible hindsight and must be avoided. As required by 35 U.S.C. § 103, claims must be considered as a whole. When so considered, the present claims are not obvious.

Claim 1

Turning to the references relied upon, Dalton, Matsushita and Ramamurthy are markedly different from the present invention and address problems only peripherally related to the solutions provided by the present invention. Dalton is assigned to the assignee of the present invention and represents one example of the present State of the Art briefly discussed in the Background of the present invention. Dalton teaches a wireless ESL communication system including a relay unit having multiple transmit antennas connected to a single RF transmitter. The transmit power from the relay unit is distributed to the electronic shelf labels by the antennas, with each electronic shelf label receiving a portion of the transmit power generated by the relay station.

Matsushita teaches a relay station disposed between a communication base station and a plurality of ESLs. When the base station communicates with ESLs, the relay station receives the communication and identifies the ESLs with which communication is conducted. The relay station monitors responses from the ESLs and identifies ESLs that did not receive proper communication from the base station. The relay station transmits identifiers of these ESLs to the base station.

Ramamurthy teaches systems and techniques for relaying information from RFID tags to appropriate destinations. An RFID reader interrogates a tag and receives information stored in the tag, including format and destination information. The reader routes the information received from the tag in accordance with the format and destination information. The reader broadcasts a transmission signal modulated by an RF carrier frequency, and receives captured signals from RFID tags. These captured signals are modulated onto the RF carrier frequency to produce a baseband information signal.

Unlike the relied upon art, claim 1 claims an electronic shelf label system employing duplex data communication. A base station includes uplink and downlink communication circuitry operating in different modes, and each of a plurality of electronic shelf labels includes uplink and downlink circuitry to allow for communication with corresponding circuitry in the base station. The base station is capable of transmitting and receiving messages concurrently over separate communication channels.

Claim 1 recites as follows:

> 1. An electronic shelf label system employing duplex data communication comprising:
> a base station including first wireless downlink communication circuitry and first wireless uplink communication circuitry operating in a different mode than the first wireless downlink communication circuitry; and
> a plurality of electronic shelf labels, each electronic shelf label including second wireless downlink communication circuitry for receiving messages from the first wireless downlink communication circuitry of the base station, and second wireless uplink communication circuitry for sending messages directly to the first wireless uplink communication circuitry of the base station,
> wherein the base station operates to concurrently transmit a first message to a first electronic shelf label and receive an overlapping second message from a second electronic shelf label over separate communication channels.

None of the cited references, nor any combination thereof, teaches or makes obvious these limitations in the claimed combination. Dalton does not address concurrent communication between a base station and a plurality of ESLs utilizing two different communication modes as presently claimed. It does not appear to recognize the problem of insufficient bandwidth, nor does it suggest a solution thereto. Dalton recognized that downlink and uplink technologies may be different at col. 1, lines 29-38, as noted by the Examiner and as further discussed at col. 3, lines 3-16. However, Dalton does not discuss concurrent use of downlink and uplink paths. Dalton is directed to, and specifically addresses, an arrangement in which a relay unit includes a single transmitter connected to multiple transmit antennae to

provide improved RF transmission while maintaining lower costs. Col. 1, lines 53-56.

Matsushita appears to be incapable of the presently claimed operation as its ESLs do not communicate directly with the base station. Instead, the status of the ESLs is communicated to the base station by intermediate relays that communicate with the ESLs to determine their status, as discussed further below. The Official Action specifically relies upon col. 5, lines 16-67 of Matsushita. That text describes the communication of base station 16 with an ESL at 2.4 GHz, as well as communication by the ESL with a radio relay station at 300 MHz. Matsushita's Fig. 5 shows details of its relay stations at 13-1 to 13-k. A Matsushita relay station includes a single 2.4 GHz transmission section 137 which transmits ID information for an ESL transmitting a negative response to the base station. Col. 5, line 61-col. 6, line 19. Similarly, details of Matsushita's base station 16 are shown in Fig. 3. Matsushita's base station has a single 2.4 GHz transmission section 164 and a single 2.4 GHz reception section 165. Col. 4, lines 63-67.

To sum up, Matsushita lacks the circuitry to support concurrent communication between a base station and plural ESLs utilizing two modes of communicating as presently claimed. All of the wireless communication by the Matsushita base station appears to utilize the single 2.4 GHz mode, and there appears to be no basis to understand Matsushita as addressing concurrent transmission and reception by the base station. Moreover, the relay station of Matsushita does not mediate communication between the base station and the ESLs, but instead identifies ESLs with which communication by the base station has failed in some way. The relay station monitors transmissions from the base station to the ESLs and identifies ESLs within its group to which a transmission has been sent. If an ESL has received its identification information, but has not received other elements of a transmission, such as price information, it transmits a weak radio signal to the relay station of its own group, and if it has failed to receive its own identifier,

it does not send any response information. The relay station identifies ESLs in its group from which weak responses have been received, or which have failed to respond at all, even though the relay station has detected transmissions to these ESLs from the base station. The relay station then sends appropriate messages to the base station to identify the ESLs that have not properly received the transmissions from the base station. The relay station does not communicate the content of the ELS responses to the base stations, but instead simply identifies the ELSs from which a proper response has not been received. See Matsushita, col. 6, line 25-col. 7, line 37. Notably, when the base station sends a communication to the ESL to which the ESL should respond, but the relay station receives no response at all from that ESL, the realy station of Matsushita communicates with the base station. When the ESL returns a proper response to the communication, no response from the relay station is sent to the base station with respect to that ESL. Matsushita thus teaches monitoring of communication as received by the ESLs and notification of the base station when ESLs do not properly receive communication, not concurrent communication between a base station and multiple ESLs.

Ramamurthy teaches systems and techniques for routing information received by an RFID reader from an RFID tag. The Examiner relies on col. 5, lines 10-23 of Ramamurthy as teaching concurrent transmitting and receiving mode with overlapping signals. However, the concurrent transmitting and receiving mode of Ramamurthy, and the overlapping signals of Ramamurthy, deal with communication between a reader and a single tag. The response of a tag is modulated onto a carrier frequency of the transmission signal emitted by the reader. The reader 40 does not read all of the tags 14a-14c simultaneously, and therefore does not achieve transmission to one tag concurrently with receiving from another tag. See, for example, col. 4, lines 40-55, which discuss various techniques for reading tags. One example is to place

packages 12a-12c bearing tags 14a-14c, respectively, on a conveyor belt near the reader 40. Other examples are to dispose the reader 40 adjacent to a doorway through which the packages 12a-12c are transported, so that the reader 40 reads each tag 14a-14c as the tag passes thereby. Still another example is the use of a handheld reader brought into proximity with the RFID tags. Each of these examples indicates that the simultaneous transmission and receiving by the reader is accomplished with respect to a single tag. Therefore, Ramamurthy does not achieve transmitting a first message to a first device and receiving a simultaneous second message from a second device. Claim 1 therefore defines over the cited art and should be allowed.

Claims 2-8

Claims 2-8 are independent claims based directly or indirectly on claim 1, incorporating all of the limitations thereof and adding further limitations thereto. In addition, the dependent claims address a number of combinations of limitations not found in the applied references. See, for example, claims 3-8, which address specific mechanisms for differentiating concurrently conducted transmission and reception. Such features are not addressed by Dalton, Matsushita, or Ramamurthy. It is clear that the relied upon references do not anticipate and do not render obvious the various mechanisms for carrying out concurrent transmission and reception as claimed.

B. Rejection under 35 U.S.C. § 103 over Dalton, Matsushita and Neumark Claim 10

The Official Action rejected claims 10, 11, and 13-16 under 35 U.S.C. §103(a) as unpatentable over Dalton and Matsushita, and further in view of Neumark. As discussed above with respect to claim 1, Claim 10 teaches concurrent communication between a communication base station and a plurality of ESLs. Claim 10 recites as follows:

10. A method of duplex data communication between a base station and a plurality of communicating with an electronic shelf labels comprising the steps of:

a) wirelessly sending a first message in a first time period to a first electronic shelf label by utilizing first downlink communication circuitry in the base station;

b) receiving the message utilizing second downlink communication circuitry in the first electronic shelf label;

c) wirelessly sending a response to the base station in a second time period using a different mode of communication utilizing first uplink communication circuitry in the electronic shelf label;

d) receiving the response in a second time period from the first electronic shelf label by utilizing second uplink communication circuitry in the base station; and

e) wirelessly sending a second message during the second time period to a second electronic shelf label utilizing the first downlink communication circuitry in the base station, sending of the second message to the second electronic shelf label being performed over a different communication channel than receiving of the response from the first electronic shelf label.

Steps d) and e) claim receiving a response and sending a message during a second time period, that is, the same time period. As noted above with respect to claim 1, neither Dalton nor Matsushita teaches or makes obvious such concurrent communication, and adding Neumark to Dalton and Matsushita does not cure their deficiencies as references with respect to claim 1.

Neumark teaches an inventory control system, using a combination of identification labels positioned in relation to inventory objects. In combination, the identification labels are able to determine their locations in relation to a given point in space. The Official Action relies on Neumark, col. 4, lines 22-39, which include discussion of the use of identification labels as part of a network of Ultra Wide Band units. Neumark states at col. 4, lines 21-23 that it uses "a network of ultra wide band (UWB) units capable, as a group, of precisely locating objects in three-dimensional space". Further, "[m]iniature units may be built into electronic shelf units". Col. 4, lines 27 and 28. The UWB network may comprise a wired or wireless simplex or duplex electronic labeling system". Col. 4, lines 29-31. "In duplex systems the label responds with an acknowledgment when addressed." Col. 4, lines 38 and 39. At col. 6, lines 40-44, Neumark further states "Signals are sent, on demand, from the first transceiving means 40 to the data

processing means 50 to confirm satisfactory operation of the identification labels". Neumark also adds by "precisely timing these transmissions, and by using matched antennas at the nodes, highly efficient communication is possible, as is described in the references." Col. 7, lines 57-59. This discussion while using the word "duplex" appears to describe an arrangement in which a label is addressed at a first time and then it responds at a second time, or in other words, in a non-concurrent operation. At col. 8, lines 8-15, Neumark further addresses its location process in a similar manner. A location request is transmitted. It is received by all of the labels 30. The labels corresponding to the identification code responds and all other labels remain silent.

While Neumark admittedly uses the word "duplex" as noted above, it does not disclose both "receiving the response in a second time period from the first electronic shelf label" and "sending a second message during the second time period to a second electronic shelf label as claimed in claim 10. Claim 10 therefore defines over the cited art and should be allowed.

Claims 11, 13-16

Claims 11 and 13-16 are independent claims based directly or indirectly on claim 10, incorporating all of the limitations thereof and adding further limitations thereto. In addition, the dependent claims address a number of combinations of limitations not found in the applied references. See, for example, claims 13-16, which address specific mechanisms for differentiating concurrently conducted transmission and reception. Such features are not addressed by Dalton, Matsushita, or Neumark. It is clear that the relied upon references do not anticipate and do not render obvious the various mechanisms for carrying out concurrent transmission and reception as claimed.

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C. Rejection under 35 U.S.C. § 103 over Dalton, Matsushita, Neumark and Ramamurthy Claims 9 and 12

The Official Action rejected claims 9 and 12 under 35 U.S.C. § 103(a) as unpatentable over Dalton in view of Matsushita and further in view of Neumark and Ramamurthy. Claim 9 reads as follows:

9. An electronic shelf label system employing duplex data communication between a base station and a plurality of electronic shelf labels, the system comprising:

a base station including first wireless downlink communication circuitry and first wireless uplink communication circuitry operating at a substantially lower frequency than the first wireless downlink communication circuitry;

a plurality of electronic shelf labels, each electronic shelf label including second wireless downlink communication circuitry for receiving messages from the first wireless downlink communication circuitry of the base station, and second wireless uplink communication circuitry for directly sending messages to the first wireless uplink communication circuitry of the base station; and

a computer coupled to the base station via a cable for sending messages to the electronic shelf label via the first and second wireless downlink communication circuitries, and for receiving messages from the electronic shelf label via the first and second wireless uplink communication circuitries,

wherein the base station operates to concurrently transmit a first message to a first electronic shelf label and receive an overlapping second message from a second electronic shelf label over separate communication channels.

Claim 12 reads as follows:

12. A method of concurrently communicating with a plurality of electronic shelf labels comprising the steps of:

a) sending first and second messages to a base station through a cable by a computer;

b) wirelessly sending the first message to a first electronic shelf label using a first frequency and first downlink communication circuitry in the base station;

c) receiving the first message by second downlink communication circuitry in the first electronic shelf label;

d) wirelessly sending a response to the base station at a second frequency different than the first frequency by utilizing first uplink communication circuitry in the first electronic shelf label;

e) receiving the response by second uplink communication circuitry in the base station;

f) transmitting the second message to a second electronic shelf label using the first frequency and first down link communication circuitry in the base station concurrently with said step of receiving the response, receiving of the first message from the first electronic shelf label and transmitting of the second message to the second electronic shelf label occurring simultaneously over separate communication channels; and

g) receiving the response through the cable by the computer.

Both of these claims address concurrent communication between a base station and one or more electronic shelf labels. As noted above with respect to claims 1 and 10, these limitations are not taught or made obvious by Dalton, Matsushita, Ramamurthy, Neumark, or a combination thereof. Claims 9 and 12 therefore define over the cited art and should be allowed.

D. The Examiner's Findings of Obviousness Are Also Contrary to Law of the Federal Circuit

As shown above, the invention claimed is not obvious in light of the relied upon prior art. It is only in hindsight, after seeing the claimed invention, that the Examiner could combine the references as the Examiner has done. This approach is improper under the law of the Federal Circuit, which has stated that "[w]hen prior art references require selective combination by the Court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself." Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 U.S.P.Q. 2d 1434, 1438 (Fed. Cir. 1988), cert. den., 109 S. Ct. 75, 102 L.Ed. 2d 51 (1988); quoting Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1132, 227 U.S.P.Q. 543, 535 (Fed. Cir. 1985). Furthermore, "[i]t is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention." Uniroyal, 837 F.2d at 1051, 5 U.S.P.Q. 2d at 1438.

In addition, the Examiner has not read the claims as a whole, as required by statute. 35 U.S.C. §103. See also, Smithkline Diagnostics Inc. v. Helena Laboratories Corp., 859 F.2d 878, 885, 8 U.S.P.Q. 2d 1468, 1475 (Fed. Cir. 1988); and Interconnect Planning Corp., 774 F.2d at 1143, 227 U.S.P.Q. at 551.

The Examiner's rejection suggests that the Examiner did not consider and appreciate the claims as a whole. The claims disclose a unique combination with many features and advantages

not shown in the art. It appears that the Examiner has oversimplified the claims and then searched the prior art for the constituent parts. Even with the claims as a guide, however, the Examiner did not recreate the claimed invention.

8. Conclusion

The rejection of claims 1-16 should be reversed and the application promptly allowed.

Respectfully submitted,

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CLAIMS APPENDIX
(Claims Under Appeal)

1. An electronic shelf label system employing duplex data communication comprising:

a base station including first wireless downlink communication circuitry and first wireless uplink communication circuitry operating in a different mode than the first wireless downlink communication circuitry; and

a plurality of electronic shelf labels, each electronic shelf label including second wireless downlink communication circuitry for receiving messages from the first wireless downlink communication circuitry of the base station, and second wireless uplink communication circuitry for sending messages directly to the first wireless uplink communication circuitry of the base station,

wherein the base station operates to concurrently transmit a first message to a first electronic shelf label and receive an overlapping second message from a second electronic shelf label over separate communication channels.

2. The system of claim 1, further comprising a computer coupled to the base station via a cable for sending messages to the electronic shelf labels via the first and second wireless downlink communication circuitries, and for receiving messages from the electronic shelf labels via the first and second wireless uplink communication circuitries.

3. The system of claim 1, wherein the first and second wireless downlink communication circuitries communicate at a first frequency and the first and second wireless uplink communication circuitries communicate at a second frequency different than the first frequency.

4. The system of claim 1, wherein the first and second wireless downlink communication circuitries communicate in a first communication band and the first and second wireless uplink communication circuitries communicate in a second communication band different than the first communication band.

5. The system of claim 1, wherein the first and second wireless downlink communication circuitries communicate at a frequency of about 2.4 GHz and the first and second wireless uplink communication circuitries communicate at an infrared frequency.

6. The system of claim 1, wherein the first and second wireless downlink communication circuitries communicate at a frequency of about 2.4 GHz and the first and second wireless uplink communication circuitries communicate through inductive coupling.

7. The system of claim 1, wherein the first and second wireless downlink communication circuitries communicate at a first frequency of about 2.4 GHz and the first and second wireless uplink communication circuitries communicate at a second frequency substantially lower than the first frequency.

8. The system of claim 7, wherein the second frequency is about 400 MHz.

9. An electronic shelf label system employing duplex data communication between a base station and a plurality of electronic shelf labels, the system comprising:

a base station including first wireless downlink communication circuitry and first wireless uplink communication circuitry operating at a substantially lower frequency than the first wireless downlink communication circuitry;

a plurality of electronic shelf labels, each electronic shelf label including second wireless downlink communication circuitry for receiving messages from the first wireless downlink

communication circuitry of the base station, and second wireless uplink communication circuitry for directly sending messages to the first wireless uplink communication circuitry of the base station; and

a computer coupled to the base station via a cable for sending messages to the electronic shelf label via the first and second wireless downlink communication circuitries, and for receiving messages from the electronic shelf label via the first and second wireless uplink communication circuitries,

wherein the base station operates to concurrently transmit a first message to a first electronic shelf label and receive an overlapping second message from a second electronic shelf label over separate communication channels.

10. A method of duplex data communication between a base station and a plurality of communicating with an electronic shelf labels comprising the steps of:

a) wirelessly sending a first message in a first time period to a first electronic shelf label by utilizing first downlink communication circuitry in the base station;

b) receiving the message utilizing second downlink communication circuitry in the first electronic shelf label;

c) wirelessly sending a response to the base station in a second time period using a different mode of communication utilizing first uplink communication circuitry in the electronic shelf label;

d) receiving the response in a second time period from the first electronic shelf label by utilizing second uplink communication circuitry in the base station; and

e) wirelessly sending a second message during the second time period to a second electronic shelf label utilizing the first downlink communication circuitry in the base station,

sending of the second message to the second electronic shelf label being performed over a different communication channel than receiving of the response from the first electronic shelf label.

11. (previously presented) The method of claim 10, further comprising the steps of:

f) sending the message to the base station through a cable by a computer; and

g) receiving the response through the cable by the computer.

12. A method of concurrently communicating with a plurality of electronic shelf labels comprising the steps of:

a) sending first and second messages to a base station through a cable by a computer;

b) wirelessly sending the first message to a first electronic shelf label using a first frequency and first downlink communication circuitry in the base station;

c) receiving the first message by second downlink communication circuitry in the first electronic shelf label;

d) wirelessly sending a response to the base station at a second frequency different than the first frequency by utilizing first uplink communication circuitry in the first electronic shelf label;

e) receiving the response by second uplink communication circuitry in the base station;

f) transmitting the second message to a second electronic shelf label using the first frequency and first down link communication circuitry in the base station concurrently with said step of receiving the response, receiving of the first message from the first electronic shelf label and transmitting of the second message to the second electronic shelf label occurring simultaneously over separate communication channels; and

g) receiving the response through the cable by the computer.

13. The method of claim 10 wherein the first and second wireless downlink communication circuitries communicate at a first frequency and the first and second wireless uplink circuitries communicate at a second frequency different than the first frequency.

14. The method of claim 13 wherein the first frequency is approximately 2.4 GHz.

15. The method of claim 13 wherein the second frequency is approximately 400 MHz.

16. The method of claim 13 wherein the second frequency is an infrared frequency.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.